In the CLAIMS

WHAT IS CLAIMED

9. Apparatus and process for generating heat by exothermic nuclear reactions in which reactions deuterium participates, with the apparatus including a reservoir enclosure filled with anhydrous, carbon-free D_2 gas and containing a metal reactor plate, with the gas-filled reservoir enclosure and the reactor plate being segments of a close-loop circulation path in which deuterium flows out of the gas reservoir onto and through a non-porous inflow metal foil, through an electrically polarized solid-electrolyte layer, onto the non-porous inflow surface of the metal reactor plate, passes through the reactor plate by permeation flow driven by a drop in deuterium chemical potential between the inflow and outflow surfaces of the reactor plate, into a second polarized solid-electrolyte layer, and out through a non-porous outflow metal foil into the gas reservoir enclosure, with the gas reservoir enclosure containing a filling tube by which the process operator can admit D_2 gas into the reservoir, and containing separate electrical leads by which the operator can apply independent voltage potentials across the inflow and outflow solid-electrolyte layers, with the reactor plate containing a dispersion of diffusion-impeding ionic solid crystallite inclusions within its interior volume, with the inflow and outflow foils and the reactor plate containing hydrogen-permeable metal, and with the edges of the 2 electrochemical cells and the permeation plate reactor being coated with a non-porous insulating material.

10. The apparatus and process of Claim 9 in which the ionic solid crystallite inclusions are made of CaO.

11. The apparatus and process of Claim 9 in which the ionic solid crystallite inclusions are made of salt-like crystallites of metal halide or metal oxide.

12. The apparatus and process of Claim 9 in which the non-metallic inclusions consist of metal oxides selected from a group comprising magnesium oxide, cesium oxide, strontium oxide, lithium oxide, beryllium oxide, boron oxide, zirconium oxide, nickel oxide, iron oxide, vanadium oxide, and titanium oxide.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In continuation-in-part re application of

TALBOT ALBERT CHUBB

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ART UNIT
3641
Examiner
Rick Palabrica

For: Apparatus and Process for Generating Nuclear Heat

It is believed that the following publications are directed to the subject matter of the Application:

KNOWN PUBLICATIONS

"Electrochemically Induced Nuclear Fusion of Deuterium", M. Fleischmann and S. Pons, J. Electroanal. Chem., vol. 261, pp. 301-398, (1989).

"Deuterium Gas Loading of Palladium Using a Solid State Electrolyte", J-P Biberian and G. Lonchampt, Proc. ICCF9 (2002), in "Condensed Matter Nuclear Science", ed. by Xing Z. Li (Tsinghua University Press, China, 2003) pp. 17-22.

"Correlation between Behavior of Deuterium inn Palladium and Occurrence of Nuclear Reactions Observed by Simultaneous Measurement of Excess Heat and Nuclear Products', Y. Iwamura, T. Itoh, N. Gotoh, and I. Toyoda, Proc. ICCF6, 274-281, (1996). Designated Iwamura et al. (1996).

"DETECTION OF ANOMALOUS ELEMENTS, X-RAY AND EXCESS HEAT INDUCED BY CONTINUOUS DIFFUSION OF DEUTERIUM THROUGH MULTI-LAYER CATHODE (Pd/CaO/Pd)", Y. Iwamura , T. Itoh, N. Gotoh, M. Sakano, I. Toyoda, and H. Sakano, Proc. ICCF7, 167-171, (1998). Designated Iwamura et al. (1998).

"Elemental Analyses of Pd Complexes: Effects of D_2 Gas Permeation", Y. Iwamura, M. Sakano, and T. Itoh, Jpn. J. Appl. Phys. 41A, pp. 4642-4650, (2002). Designated Iwamura et al. (2002)

"Low Energy Nuclear Transmutations in Condensed Matter Induced by D_2 Gas Permeation Through Pd Complexes: Correlation between Deuterium flux and Nuclear Product", Y. Iwamura, T. Itoh, M. Sakano, and S. Kuribayashi, in ICCF10 Abstracts, Presentation Tu15, (2003). Designated Iwamura et al. (2003)

"Replication of MHI Transmutation Experiment By D_2 Gas Permeation Through Pd Complex", T. Higashiyama, M. Sukano, H. Miyamaru, and A. Takahashi, ICCF10 Proceedings preprint, distributed through www.LENR-CANR.org, pp. 1-6, (2003). Designated Higashiyama et al. (2003)

"The dd Cold Fusion-Transmutation Connection", T. A. Chubb, Proc. ICCF10, pp. 753-766, (2006). Designated T. A. Chubb "The dd Cold Fusion-Transmutation Connection"

"LENR: Superfluids, Self-Trapping and Non-Self-Trapping States" T. A. Chubb, Proc. ICCF10, pp. 767-770, (2006). Designated T. A. Chubb "LENR: Superfluids, Self-Trapping and Non-Self-Trapping States".

"Inhibited Diffusion Driven Surface Transmutations", Proc. ICCF 11, pp. 678-693, (2006). Designated T. A. Chubb "Inhibited Diffusion Driven Surface Transmutations."

In the DESCRIPTION OF PRIOR PUBLICATIONS

DESCRIPTION OF PRIOR PUBLICATIONS

Referring to the known prior publications, Fleischmann and Pons, J. Electroanal. Chem., vol. 261, pp. 301-398, (1989), described studies demonstrating the release of nuclear heat in the cathode of an electrochemical chemical cell in which deuterium ions (D^+ = mass-2 hydrogen ion = deuteron) were neutralized on the surface of a palladium cathode. Biberian and Lonchampt, Proc. ICCF9 (2002), in "Condensed Matter Nuclear Science", ed. by Xing Z. Li (Tsinghua University Press, China, 2003) pp. 17-22, described an apparatus and process for transferring deuterium from D_2 gas into and out of a metal using an electrically polarized solid electrolyte. Iwamura et al. (1996) describes use of heavy water electrolysis cell to deposit deuterium on permeation plate reactor and to produce excess heat and nuclear products. Iwamura et al. (1998) describes use of heavy water electrolysis cell to deposit deuterium on permeation plate reactor containing internal CaO layers and demonstrating production of excess heat and nuclear products. Iwamura et al. (2002) describes means for creating a nuclearly active form of deuterium and for detecting its participation in exothermic nuclear reactions by means of a transmutation of surface cesium into surface praseodymium. Iwamura et al. (2003) reported on advances in expanding their use of nuclearly reactive deuterium and its participation in exothermic nuclear reactions, and in further confirming the identity of the transmutation product. Higashiyama et al. (2003) reported on replications of the Iwamura et al. process at Osaka University. All the previous cesium transmutation work had been carried out by Iwamura et al. at the Advanced Technology Research Center of Mitsubishi Heavy Industries. T. A. Chubb "The dd Cold Fusion-Transmutation

Connection" describes theory modeling wavelike deuterons participating in exothermic nuclear reactions in/on a metal solid . T. A. Chubb "LENR: Superfluids, Self-Trapping and Non-Self-Trapping States" describes differences in ion behavior between ions in deep potential wells in metals and ions in shallow potential wells in metals. T. A. Chubb "Inhibited Diffusion Driven Surface Transmutations" models fusion processes and exothermic nuclear surface reactions taking place in Iwamura et al. (2002).